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ENVIRONMENT AND SUSTAINABLE DEVELOPMENT: INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

Early-warning capacities of the United Nations system with regard to natural disasters

Report of the Secretary-General

SUMMARY

The present report is submitted pursuant to General Assembly resolution 49/22 B of 20 December 1994 and contains information about the early-warning capacities within the United Nations system with regard to natural and similar disasters which have an adverse impact on the environment. The use of telecommunications in support of early warning is described in accordance with Economic and Social Council resolution 1995/47 A of 27 July 1990.

The report reviews the current early-warning activities of organizations in the United Nations system and proposes improvements and ways in which they may be coordinated more effectively. Consideration is given to the roles of technology and telecommunications in the warning process. Conclusions and proposals are made for a process that can lead to the appropriate transfer of technology, in particular to developing countries, and for means of contributing to improved coordination of early warning internationally.

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I. INTRODUCTION

A. The value of early warning

1. The timely and effective warning of possible disaster is a self-evident objective, universally pursued by Governments and organizations in determining disaster-reduction strategies. It is critical for individuals in local communities organizing practical measures to protect their own lives and property. Advances in science and technology have expanded the possibilities of anticipating the effects of many, but still not all, of the hazards which threaten nearly every country in some way.

2. As countries incorporate disaster-reduction policies into their national social and economic development plans, establish effective preparedness measures and improve their response capacities, the value of timely and effective warnings in averting losses and protecting resources becomes apparent. Many sectors of a society need to contribute to these efforts. When they are able to focus their attention on mutual collaboration for effective early warnings, the results can be impressive.

3. In 1991, government officials of Andhra Pradesh, India, were able to implement a previously planned programme to evacuate 600,000 people from the path of an approaching cyclone within 40 hours. This was possible because the results of meteorological forecasts and warnings were communicated through a combination of advanced and traditional channels to people conversant with the preparedness plan from earlier community exercises. Fatalities numbered less than one tenth of the more than 10,000 people who perished in a similar cyclone 13 years before. At that time in the same location, neither warning, communications nor local response capacities were as well established.

4. Another example of successful early warning occurred prior to the volcanic eruption of Mt. Pinatubo in the Philippines in 1991. The results of sophisticated scientific monitoring techniques were translated rapidly into a common public understanding through simple means directly to the vulnerable communities. When these warnings were coupled with the timely implementation of previously organized preparedness activities, more than 350,000 people were spared personal physical harm from the largest explosive volcanic eruption of the twentieth century.

5. While not all hazards offer the same possibility of prediction or forewarning, national Governments none the less bear the sovereign responsibility to the best of their abilities to protect their citizens from disasters. In this respect, Governments in their policies, and local communities by their actions, display varying degrees of awareness, commitment and ability in adopting successful disaster-reduction strategies.

6. Organizations of the United Nations system have shown long-standing commitments to early-warning programmes. In some cases, programmes have provided an institutional base or framework for the identification and reporting of specific hazards at international or regional levels. In others, they have been instrumental in encouraging common standards or procedures which assist in

the collection, interpretation or dissemination of data. Their activities frequently transfer technology among specialists or between national authorities. Other programmes focus on technical assistance and training for capacity-building in developing countries.

7. For all the recent scientific and organizational progress made in the conceptualizing, establishment and operation of early-warning systems, both within and beyond the United Nations system, early warning is still inadequate for most of the world's population. The technical ability to foresee and interpret most hazards is no longer as limited as it once was. Modern communications technologies provide more access to information, more quickly. A major challenge remains to ensure that this knowledge can be accessible to, understood by and acted upon by local communities and the people most directly affected by threatened disasters.

B. International interest in early warning

8. Since the proclamation of the International Decade for Natural Disaster Reduction by the General Assembly in its resolution 44/236 of 22 December 1989, the International Framework of Action for the International Decade for Natural Disaster Reduction, contained in the annex to the resolution, has provided a wider context for concerted international action to involve technical resources and improved coordination in critical areas of natural disaster reduction. Timely and effective warnings are a basis for creating the culture of prevention necessary for a safer world in the twenty-first century.

9. During the Conference on Disaster Communications held in May 1991 at Tampere, Finland, the unequal access of countries to communications technology for effective early warning was identified. While many of the recommendations of the Conference addressed communication requirements for emergency response, one recommendation in particular encouraged the establishment of mechanisms for international cooperation in the use of terrestrial and satellite communications technologies in the prediction, monitoring and early warning of disasters. 1/

10. By building on the increasing awareness of disaster prevention among countries encouraged by the International Decade, the World Conference on Natural Disaster Reduction, held at Yokohama, Japan, from 23 to 27 May 1994, succeeded in providing renewed emphasis and focus to achieve the goals of the Decade. One of these goals, formulated in the founding resolution of the Decade (resolution 44/236), is to provide by the year 2000 ready access for all countries to global, regional, national and local warning systems and the possibility of broad dissemination of warnings.

11. In specific terms, the findings of the Yokohama Conference's Technical Committee on Warning Systems, organized jointly by the World Meteorological Organization (WMO) and the United Nations Educational Scientific and Cultural Organization (UNESCO), provide expert guidance for future applications of existing knowledge. 2/

12. The primary outcome of the Conference, the Yokohama Strategy for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation,

containing the Principles, the Strategy and Plan of Action, 3/ supplemented by the Yokohama Message 4/ and the recommendations and reports of the Main Committee and Technical Committees of the Conference, 5/ constitute a basis for concerted international efforts encouraged by the United Nations to improve early warning of disasters.

13. The Yokohama Strategy and Plan of Action underscore the importance of strengthening capacities at local, national, regional and international levels to warn of the possibility of disaster from natural phenomena or environmentally destructive occurrences. A principle of the Strategy notes that early warnings and their effective dissemination by telecommunications, broadcast services and other means are key factors to successful disaster prevention and preparedness. The Strategy itself emphasizes, inter alia, the necessity for improved risk assessments, broader monitoring and the communication of forecasts and warnings.

14. These forward-looking outputs of the Conference were considered by the General Assembly during its forty-ninth session and endorsed in its resolution 49/22 A of 2 December 1994. The General Assembly recognized the specific value of early warning and effective dissemination as key factors to successful disaster prevention and preparedness in all countries, but especially for developing countries.

15. In the context of the International Decade for Natural Disaster Reduction, the General Assembly also adopted resolution 49/22 B of 20 December 1994, in which it requested the Secretary-General to report to it at its fiftieth session on early-warning capacities within the United Nations system. The Assembly also invited proposals on how those capacities might be improved and better coordinated in order to provide for an adequate response to natural disasters and similar disasters with an adverse impact on the environment.

16. In addition, and by taking account of chapter 34 of Agenda 21 6/ as well as the Principles of the Yokohama Strategy for a Safer World, proposals were invited on the transfer of technologies related to early warning, particularly to developing countries. Recommendations were also requested on the capacity of the United Nations system to coordinate information about natural and similar disasters, and how this information could be passed effectively to national, regional and sectoral early-warning capacities.

17. Subsequently the Economic and Social Council, during its substantive session of 1995, adopted resolution 1995/47 A of 27 July 1995, in which it recognized the importance of reliable and hazard-resistant telecommunications for disaster reduction, in particular in support of early warning at all operational levels. The Council also invited proposals from the Secretary-General for further improvements in the field of disaster-related telecommunications and further invited him to ensure close cooperation between the International Framework of Action for the International Decade for Natural Disaster Reduction, the Department of Humanitarian Affairs of the United Nations Secretariat and the International Telecommunication Union (ITU).

18. As the world takes a serious look at development requirements into the next century, as well as the means by which resources can best be utilized within the United Nations system, early-warning strategies provide one of the keys for

coordinated efforts to protect development accomplishments. Improved early-warning practices can link the abilities and resources of the United Nations system with the interests of all countries in protecting human resources and physical assets. At the same time, national capacities for disaster reduction can be created within those communities most exposed to natural hazard.

II. THE DISASTER CONTEXT OF EARLY WARNING

A. The purpose of early warning

19. Early warning is a deceptively simple notion. It can be understood narrowly as the means by which a potential danger is detected or forecast and an alert issued. However, this leaves unspecified the responsibilities for the dissemination of warnings and the response which is necessary to avoid potential harm or loss.

20. Warnings represent an added value and function. There are three abilities which constitute the basis of early warning. The first, largely a technical ability, is to identify a potential risk, or the likelihood of occurrence, of a hazardous phenomenon which threatens a vulnerable population. The second ability is that of identifying accurately the vulnerability of a population to whom a warning needs to be directed. The third ability, which requires considerable social and cultural awareness, is the communication of information to specific recipients about the threat in sufficient time and with a sufficient clarity so that they take action to avert negative consequences.

21. This highlights four components of the warning process:

(a) Assessment of the vulnerability of potentially affected people;

(b) Detection, interpretation and forecasting of hazards;

(c) Formulation and dissemination of warning messages to specific targeted recipients;

(d) The perception of and reaction to warnings by the intended recipients.

22. For the warning to be successful, these actions need to be taken in sufficient time in order to save lives, property and livelihoods that would otherwise be lost to disasters. Depending on the nature of the hazard, the location of vulnerable people and assets, and designated responsibilities for action, elements of warning systems may be organized and implemented at local, national, regional or international levels.

23. The early-warning process has to be interpreted in this broad context in order to address the General Assembly's concern for improvements in warnings.

B. Effectiveness of early warning

24. Warning systems are only as good as their weakest link. They can, and frequently do, fail in both developing and developed countries for any of four primary reasons. There can be a failure of forecasting, demonstrated by an inability to understand a hazard or a failure to locate it properly, in time or space. There also may be an ignorance of prevailing conditions of vulnerability determined by physical, social, or economic inadequacies. A third possibility can be a failure to communicate the threat accurately or in sufficient time. Finally, there can be a failure by the recipients of a warning to understand it, to believe it or to take suitable action.

25. The capacity of a Government or a community to respond to a warning can also be constrained by a range of practical as well as conceptual limitations. Adequate human, material and technical resources are needed to establish and operate early-warning systems properly. This raises choices as to whether to apply often scarce resources to meet other competing priorities within a society, or to provide protection for assets over a longer period of time against something which may only occur in the unspecified future, or perhaps not at all.

26. The functions of early warning are accomplished by various professional or specialized groups in a society. They include the scientific community, government officials, communications authorities, broadcast media, disaster-management agencies and often the military. Each of these groups has its own organizational structure and methods of operation. The nature of their regular responsibilities does not necessarily bring them together to address issues of early warnings.

27. If a narrow approach to warning is taken by an agency or organization, limited to its own area of competence and with less regard to the utilization of its output by others, the reliability and utility of the entire system is diminished. Therefore, each phase of the warning process must be accomplished effectively, accurately and in a timely manner with a full understanding of the relationship to the other parts of the process. A basic indicator of success for early warning is the demonstrated capacity for joint action among the various contributors.

C. Disasters, vulnerability and risk

28. Disasters happen when a natural phenomenon or unplanned occurrence of great force strikes a population that is vulnerable to its effects. During the latter half of the twentieth century, the results of scientific endeavours have provided a much better understanding about the natural forces which shape hazards and determine their behaviour. Major advances have been made in the capacity to anticipate potentially destructive natural phenomena and in the use of communication media to channel this knowledge to the people concerned.

29. At the same time, rapid population growth has increased social and economic pressures on the natural environment in many countries. Natural features which previously provided protection from hazards have been uprooted or altered. The

growing tendency of people to live on marginal or fragile landscapes or in conditions of urban poverty has increased their vulnerability to hazards. Despite the best efforts, only modest gains have been registered in the equitable distribution of the benefits of national development in many countries. These issues, along with other unfavourable social and economic factors have combined to increase the number of people who are exposed to risk - and are therefore at risk - from natural and similar disasters.

D. Hazards

30. With the exception of earthquakes, it has become technically possible to anticipate the occurrence of most disasters arising from natural hazards, although the time of forewarning and the range of appropriate responses to the risk varies with the individual hazard. With regard to human-induced hazards, which could have an adverse impact on the environment, greater complexity and our still evolving knowledge make their identification and forewarning more demanding.

31. In considering the early warning of natural disasters and similar disasters with an adverse impact on the environment, as stipulated in General Assembly resolution 49/22 B, the present report does not include disasters arising from extreme social, ethnic or political disparities or conflict situations which may induce large population displacements. Other slowly evolving factors which may constitute forms of long-term environmental modification and potential future hazards, such as global warming and rising sealevels, are also beyond the scope of early-warning concerns covered by the report.

32. The following categories reflect the types of hazards reviewed in the present report and addressed by early-warning capacities within the United Nations:

(a) Meteorological and hydrological hazards, including floods, droughts, all types of storms, cyclones/typhoons/hurricanes, weather and climate extremes;

(b) Geophysical hazards, including earthquakes, landslides, volcanic activity, mudflows, tsunamis;

(c) Environmental hazards, including erosion, drought, desertification, wildfire, infestation;

(d) Technological hazards, including accidental nuclear, chemical or industrial release, structural or infrastructural systems failure.

33. While the above categorization is of assistance for a review of existing warning systems, it should be noted that one type of disaster can trigger others, as in the case of an earthquake resulting in flooding, urban fire or technological emergencies. The users of warning systems need to be aware of the possibility for multiple hazards and their compound effects.

III. TECHNICAL PRACTICES AND EARLY WARNING

A. Technology and warning practices

34. New technologies can provide better understanding about hazards and can lead to improved accuracy in forecasting. The wider availability of information collection, storage, retrieval and dissemination by electronic means has facilitated the exchange of information among technical specialists and provided increased preparatory lead times. None the less, both industrialized and developing countries still need to arrange effective regulatory, institutional and agreed professional procedures for the useful application of those technologies that are available. The challenge in applying technology to disaster reduction is less a matter of its availability or suitability, than a need to understand it, the associated costs and the working relationships among intended users.

35. As the costs of innovations are reduced and the operational requirements of technology become simplified, advanced technical applications will become more widespread in early warning. With the acquisition of additional technical skills and the spread of personal computers, disaster managers at local community levels can access user-oriented technologies such as decision-support systems that can evaluate different scenarios for populations and property at risk. As access to more information increases, however, information management will become a major factor.

36. With the rapid advance of technology, it is necessary to recall who the primary recipients of early warnings are and the conditions in which many of them live. In many prevailing social and economic conditions, traditional systems provide the primary services and means for early warning. They can become more effective if actively promoted and refined for this purpose, especially if they relate to traditional disaster-reduction knowledge accumulated within local communities.

37. In contrast to the introduction of costly and sophisticated innovations, the improvement or partial updating of existing capacities may be more cost-effective. In order to ensure an equitable development of early-warning capacities world wide, there is a need to recognize both the relative values of traditional systems and the benefits of more sophisticated technologies. It is equally important to ensure that each type can be adapted, and that they can interact, when appropriate.

B. Communications and early warning

38. There are essentially three types of communications systems involved in the early-warning process. The first focuses on the detection of the hazard and the assessment of any risk which it may pose. The communications component is the telemetry associated with the relay of data and information from observing technologies to scientists or other specialists of the phenomenon. These systems are generally dedicated to the particular applications of the discipline concerned and managed by its scientific establishment.

39. The second level of communication links the technical community familiar with the hazard to the body of officials, politicians, government agencies or other organizations which are responsible for determining the relevance of hazard data to populations at risk. In order for them to carry out this responsibility of informing about an imminent threat and mobilizing appropriate preparedness and response measures, communications among the primary actors are essential. These actors may include civil-defence authorities, selected ministries, technical agencies and possibly military authorities. In this area, communications systems are frequently dedicated for the purpose and managed independently of regular public or communications services.

40. The third, and ultimately most critical stage of communications relates to conveying warnings and information to the public and local communities. Some elements of these networks may be managed by privately owned or commercial broadcasting entities, while others are operated by local or national authorities. The utility of these networks varies widely from country to country and even within countries.

41. Some advanced communications systems can transmit data to an automated facility, from which they are re-transmitted to the public without any additional human action. They can also activate automatic procedures in order to halt critical systems through electronic means. It is important that these technological possibilities provide the information that is relevant to a specific audience. This is an important human element requiring insight and understanding of local political, cultural and social situations.

42. The communications necessary for effective warnings are those which are in place and operational prior to the onset of a hazard. While there is a need for basic operational reliability, many established and routine forms of communication can be utilized effectively for early warning if there is an official recognition of their utility and organizational planning to do so. National telephone systems and existing radio networks of national agencies can be effective instruments for this purpose. This point is easily confused with other, quite different requirements for emergency communications necessary in the subsequent rescue and relief phases of disaster management, after the disaster has occurred and when previously existing means of communication may have become inoperable.

43. Satellite and other technologically advanced communications systems have proved their worth in disaster detection, analysis and preparedness, as well as response, but it is nevertheless important to relate these systems to the terrestrial systems, which are still the most characteristic means of communication within many developing countries. The ability of many people to provide for their own protection will continue to depend on local and familiar means of communication.

44. Many villages throughout the world will continue to use radio broadcasts, telephones, church bells, gongs, gunshots, sirens, loudspeakers, flags, marketplace public notices, instructions given by the mayor and other routine forms to convey local warnings. Ultimately, the added value of technology lies in its effective marriage with existing forms of communication to enhance the

accessibility and to increase the understanding of warnings by a greater number of people.

C. Technological opportunities

45. Relevant technological applications for improved warnings can best be considered by relating them to the primary functions of warning systems (see paras. 20-21 above). As the respective needs differ, so do the opportunities for possible transfer of technology.

46. Satellites, through their continuous coverage of the globe, provide essential information that can lead to effective detection and interpretation of many hazards. The ability of meteorological satellites to monitor the atmosphere continuously and to communicate varied types of data easily have made them a mainstay in the identification and analysis of meteorological and hydrological conditions. With their well-developed technology and relative simplicity in reporting, the use of satellites for transmission of data is one way of reducing costs while greatly enhancing the efficiency of in-country communications for early warning, once the expensive capital costs are met. The utility of their products is evident, for example, in the photographs of cloud cover which appear regularly in newspapers and other forms of media throughout much of the world.

47. Airborne and satellite remote-sensing techniques such as aerial photography, imaging radar and multi-spectral scanning represent other tools which can improve hazard detection and analysis. They can be used to observe, map and monitor features and phenomena on the earth's surface. Data can be provided or changes measured for estimating rainfall or observing possible indicators of drought or infestation. Experimental work continues to expand satellite observation for flood forecasting and identification of possible landslide warnings and in contributing to experimental efforts of earthquake prediction and possible volcanic activity.

48. Sophisticated analytical remote-sensing tools have been married to simplified graphical representations that are able to provide packaged information for particular locations or purposes. When linked with personal-computer technology and the possibility of electronic communications, the information becomes highly portable and widely accessible. While vast amounts of information can be generated, compilers or packaged information can tailor the amount of data or the complexity of its presentation to match the requirements and skills of end-users.

49. As the judgements and decision processes of experts and large amounts of scientific information can be compiled in computerized decision support systems and disseminated at minimal cost, there is an expanding opportunity to translate specialist knowledge into forms suitable for local applications. The development of CD-ROM technology in connection with personal-computer applications can bridge technical information gaps economically in many countries. Expert systems can be used to provide guidance for decision-making by disaster managers or in guiding an appropriate response for specific types of warnings.

50. The combination of remote-sensing data with global positioning and geographic information systems (GIS) can provide a powerful means for more precise interpretation of data if a sufficient level of expertise and technical resources is available. The technology can relate important community facilities graphically to areas of potential hazards to facilitate the preparation of the risk maps which are essential for planning effective preparedness and response measures. These technologies can also be applied to provide a more refined analysis of terrain factors to identify potential mountain hazards.

51. As the forecasting of natural hazards relies on the analysis of mathematical models and verifiable environmental conditions, any opportunity for new or additional information to update and develop these references further is important. The availability of more precise data generated by any advanced technology contributes to potential gains in warning accuracy through improved interpretive skills. Applications of space technology, especially, have provided a dramatic increase in the possibility of monitoring and improving understanding about the relationships between the earth's physical, chemical and biological interactions in the atmosphere, oceans and land areas.

52. A regional remote-sensing project in support of the early-warning and food security system for the 11 countries of the Southern Africa Development Community (SADC) provides an example of how technical assistance can support regional and national warning capabilities. Started in 1988, the project has established an operational information system able to process satellite and space technology data into information products disseminated among SADC countries over electronic mail links. GIS applications are used to support regional and national early-warning systems. The use of electronic mail and an inexpensive combination of hardware and software allows individual country agencies to access information materials throughout the region.

53. The project has been able to apply modern applications of technology, but without losing a human dimension in creating a sustainable basis for the programme. All of the technical support and necessary backstopping is to be met from within the shared capacities of the SADC countries.

IV. UNITED NATIONS SYSTEM INVOLVEMENT IN EARLY WARNING

54. Within the United Nations system there are numerous activities which contribute to different aspects of the early-warning process. A review of the purposes, primary actors and perceived strengths or relative weaknesses of various programmes is contained in a technical information paper prepared by the secretariat of the International Decade for Natural Disaster Reduction. The summary given here indicates the breadth and diversity of the commitment of the United Nations to early warning.

A. Early warning for meteorological and hydrological hazards

55. Early-warning systems can have a marked effect on reducing fatalities associated with meteorological and hydrological disasters. In the 30 years

between 1900 and 1929, hurricanes killed more than 10,000 people in the United States of America. In the period from 1947 to 1975, fewer than 2,000 died despite similar occurrences of the hazard. By 1992, as one of the most powerful storms to hit the North American coastline, hurricane Andrew caused more than $20 billion in damages but caused only 23 deaths, in a striking testimony of the effectiveness of early-warning systems.

56. In spite of larger and more concentrated populations living in areas of risk, these accomplishments have been made possible by means of faster transmission of more data, improved forecasting, the composition of better warnings and effective communication of information to the public. Most importantly, the warning process is integrated into organized emergency planning and effective community response programmes.

57. A consistent global approach within the United Nations system has yielded beneficial returns on investments in meteorological and hydrological warning activities. The World Weather Watch (WWW), coordinated by the World Meteorological Organization (WMO), is a telling example of global cooperation in the collection, analysis and distribution of vital weather information and forecasts. Standardized communication systems, protocols for the presentation of observed data and processed information and a common terminology, all developed under the auspices of WMO, have been the keys to universal acceptance and usefulness.

58. The coordinated efforts of national systems comprise the three main components of the World Weather Watch system. The Global Observing System observes and measures meteorological conditions by air, land, sea, and space, providing data and information needed by a country for its own weather services on a daily basis, in addition to forecasting severe events. The associated Global Data Processing System consists of a network of global and regional data-processing centres which produce daily weather analysis, forecasts and guidance for weather advisories. These are disseminated world wide by the third component, the Global Telecommunications System. The experience gained over 30 years demonstrates the utility of free and unrestricted exchange of information through a dedicated global means of communication linked to individual national technical agencies.

59. The Twelfth World Congress of WMO provided additional emphasis for the organizations' role in fostering inter-agency coordination related to early warning. Member countries encouraged WMO to provide the benefit of its specialist knowledge, information and operational structures related to meteorology and hydrology in support of United Nations humanitarian and relief efforts before, during and after natural disasters and other forms of crisis. This important organizational initiative underlined the types of effort which can foster greater synergies among specialized agencies for common benefit.

60. WMO has established coordination mechanisms to provide comprehensive coverage and early-warning capability for tropical cyclones through the regionally coordinated actions of the Tropical Cyclone Programme. Activities are accomplished in association with national meteorological services located in the six affected regional ocean basins of the world and in the Asia and the

Pacific region, with the additional collaboration of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP).

61. The WMO programme assists member countries in upgrading their national forecast and warning services for tropical cyclones and related hazards through regionally coordinated systems. An important part of the strategy is the encouragement of country authorities to establish national disaster prevention and preparedness measures and the promotion of effective community responses to warnings. In recognition of the vital role of national meteorological services in providing warnings of severe weather events to the community, WMO's Public Weather Services Programme includes specific projects directed at strengthening the capacities of national meteorological services and in raising the awareness and level of public understanding about the services provided.

62. The Hydrology and Water Resources Programme of WMO is a world-wide network of flood forecasting systems consisting of data collection and transmission systems linked in real time to national and basin-wide forecasting centres. As with WWW, the systems are operated by national agencies of the countries concerned, working within a common agreed framework of functions and reporting standards. Warnings are disseminated within the relevant basin area by the technical facilities concerned.

63. The current development of the World Hydrological Cycle Observing System by WMO, with the support of the World Bank and others, will help to coordinate bilateral and multilateral contributions at both international and regional levels to further the coordination and technical consistency of water resource systems in the developing countries within the Hydrology and Water Resources Programme.

64. The African Centre for Meteorological Applications to Development and the Drought Monitoring Programme in Eastern and Southern Africa are other examples of regional programmes initiated by WMO to develop hazard-monitoring capabilities linked to longer-term national development objectives within a geographical area. Through ongoing assessment activities and the production of medium-term forecasts appropriate to climatological and drought hazards, these programmes demonstrate the potential social and economic significance of technical cooperation motivated by early-warning initiatives.

B. Early warning for geophysical hazards

65. Given the nature of the phenomena, the opportunities for accurate prediction and warnings of geophysical hazardous events are limited and earthquake prediction is not yet possible. Advances in scientific research have improved the interpretation of critical stages in preliminary volcanic activity, although that alone does not prevent disasters, as was tragically demonstrated in 1985 by the Nevada del Ruiz volcanic mudslide in Colombia. There can be a brief warning period prior to the effects of a local tsunami, or several hours' notice provided for ocean-wide warnings of tsunami events. In either case, warnings are useful only to the extent that response mechanisms can act at short notice.

66. There is no global, comprehensive identification or warning structure within the United Nations system for geophysical hazards. There is, however, the hazard-specific Pacific Tsunami Warning System organized by the Intergovernmental Oceanographic Commission (IOC) of UNESCO. From the Pacific Tsunami Warning Centre in Hawaii, the programme monitors seismic and tidal reporting stations spread among 26 participating countries to detect and locate earthquakes in the Pacific region which may generate tsunamis.

67. Warning and information bulletins are issued rapidly through the WMO Global Telecommunications System and in conjunction with the telecommunications network of the international aeronautical systems. A variety of local visual and auditory warning signals then alert populations in potentially affected areas. Public education and awareness activities have proved to be essential in the countries concerned, and information guides are prepared to support education, operations and field studies of the specific hazard.

68. While there is no comprehensive international programme for the early warning of geophysical hazards, there are some internationally acknowledged technical facilities or national agencies which collect, analyse and disseminate information regarding global seismic and volcanic events. The Global Volcanism Network of the Smithsonian Institution in the United States, the National Earthquake Information Centre of the United States Geological Survey and the International Seismological Centre in the United Kingdom of Great Britain and Northern Ireland are three such examples which provide information world wide. While these and other agencies monitor and document seismic events, and UNESCO is active in supporting activities in geophysical activities, there remains an unmet need for the global consolidation of geophysical disaster awareness, reduction and support to national capacity-building, as is evident with other types of hazards.

C. Early warning for environmental hazards

69. Droughts develop from a complex interaction of factors, including land use, water management practices, weather and many aspects of human activity. Agricultural production and other relationships between economic or social requirements of a society and the environment can be affected by disruptive factors such as pests, erosion, pollution or severe weather conditions which occur over long or short periods of time. Because of this complexity and uncertainties about human actions, early warnings about environmental hazards must be sensitive to many variables. The monitoring of potential hazard indicators, the formulation of warnings and the identification of appropriate response mechanisms for environmental hazards all require a broad range of organizational involvement and a variety of professional abilities.

70. The Global Information and Early Warning System on Food and Agriculture (GIEWS) operated by the Food and Agriculture Organization of the United Nations (FAO) is a comprehensive international warning system for crop and food supply conditions. It monitors the international crop and food supply/demand conditions and the factors likely to affect them. It identifies countries and regions where food shortages may become imminent and maintains continuous assessments of possible emergency food needs, maintaining close liaison with the

World Food Programme (WFP) in the process. Satellite data are used extensively to monitor crop conditions.

71. FAO receives monthly reports of demand requirements and cropping conditions from FAO member countries; this is augmented by additional information obtained from other United Nations organizations such as WFP, WMO, the World Health Organization (WHO), the Office of the United Nations High Commissioner for Refugees (UNHCR), the United Nations Development Programme (UNDP) and the Department of Humanitarian Affairs of the United Nations Secretariat, special joint assessment missions, and from other contributors outside the United Nations. The programme disseminates forecasts and reports ongoing assessments to Governments, international organizations, scientific and private institutions and others world wide. Special country alerts are issued in cases of the rapid deterioration of a country's food security situation.

72. FAO also supports regional initiatives that monitor additional threats to food supplies. The FAO Desert Locust Information Service monitors, analyses and disseminates information about the locust situation in affected countries, in conjunction with associated weather and vegetation conditions. Use is made of satellite remote sensing, GIS and analytical models of locust behaviour to provide forecasts and early-warning information. The FAO Emergency Prevention Systems for Transboundary Animal and Plant Diseases for Desert Locust Component is another regional programme which alerts and supports response activities for this particular hazard. By focusing on capacity-building, it acts to reduce the risk of locust plagues through long-term management and research activities in the affected countries.

73. A comprehensive environmental monitoring programme has been initiated by the United Nations Environment Programme (UNEP). The United Nations System-wide Earthwatch Programme is proceeding to coordinate, harmonize and integrate the observation, assessment and reporting activities related to environmental and socio-economic information throughout the United Nations system. The objective is to provide a consolidated basis for decision-making about sustainable development and to warn countries and the development assistance community of emergency problems requiring concerted and timely international action.

74. Regional or intergovernmental authorities provide additional emphasis for specific warning requirements. The Intergovernmental Authority on Drought and Development, composed of countries in north-eastern Africa, manages a regional Early Warning and Food Information System. The programme monitors crop and livestock production and marketing through systematic data collection and analysis. Efforts are focused on the development and application of early-warning methodologies and improved communications suited to the area, in addition to local staff training and the distribution of information.

75. Other similar programmes are the Regional and National Early Warning System conducted by the countries of the Southern Africa Development Community and the AGHRYMET Programme of the Inter-State Committee on Drought Control in the Sahel. Support is provided by United Nations specialized agencies to each of these programmes, in which satellite observation and electronic communications systems are employed along with conventional national and regional telecommunications

systems for the interpretation and dissemination of early-warning information for participating countries.

D. Early warning for technological hazards

76. In addition to providing emergency warnings of an imminent technological threat to the environment, as in a chemical or nuclear release, the systematic analysis of information, often involving a multidisciplinary range of specialists, is an important component of early warning for technological hazards. In contrast with known natural hazards with evident effects and likely seasons or location of occurrence, technological or chemical hazards having an adverse effect on the environment may exist in the midst of communities which are unaware of the threat which they represent.

77. There is a special need for early warnings of technological hazards to be able to alert, but also to identify, evaluate and inform about sources of potential risks. As there can be causal relationships between natural and technological disasters, there is a growing concern that multiple hazard risks are emerging more rapidly than the knowledge base to anticipate appropriate means of prevention or response.

78. In the area of nuclear and radiation hazards, the International Atomic Energy Agency (IAEA) oversees an international framework organized to minimize the environmental, health and economic consequences of a nuclear accident. The 1986 IAEA Convention on Early Notification of a Nuclear Accident is the primary instrument to ensure the timely and adequate notification to authorities of countries that might be affected by a nuclear accident. It is a matter of some interest that the Convention, now ratified by 75 countries with 68 additional signatory countries which have not yet ratified it, was negotiated immediately after the Chernobyl reactor accident.

79. IAEA requires that accident notifications refer to standardized data to create a common information structure. Requirements were outlined in a 1992 guidance document and IAEA provides a standard basis of reference with the International Nuclear Event Scale, which allows a common understanding of nuclear events among the technical community involved, the media and the public. As it is used to describe the magnitude of an event and also to inform the public promptly and consistently of various aspects pertaining to safety, it could serve as a model for the development of global nomenclature and advisory standards for other types of hazards and comprehensive warning systems.

80. IAEA collaborates with other international organizations in an exemplary model of coordination which is based on the reliability and technical abilities of its partners. The coordinating mechanism is the Inter-agency Committee for the Response to Nuclear Accidents, which is chaired by IAEA. WMO plays an important supporting role, as it provides IAEA with 24-hour backup support to prepare projections of atmospheric conditions essential for accurate warnings. WMO's Global Telecommunications System is also utilized by IAEA for the dissemination of warnings. WHO participates with a concern for medical and health-related issues, as well as maintaining special arrangements to provide public-health support in response to a request from a national ministry of

health. FAO is concerned with food distribution and consumption issues following an event, while UNEP contributes environmental and natural resources information and support. IMO provides technical information in relation to nuclear pollution at sea. The Department of Humanitarian Affairs of the United Nations Secretariat assists in the dissemination of information about the event internationally.

81. In a broader context, WMO has an environmental Emergency Response Activities programme to facilitate the international exchange of data and information following the dispersion of nuclear or other forms of environmental pollution. As a component of WMO's World Weather Watch system, the ERA programme has global objectives to develop and improve the capabilities of member countries to respond effectively to human-induced environmental emergencies. WMO coordinates its ERA involvement with that of other international agencies and regional organizations to ensure programme effectiveness in responding to early warnings.

82. The UNEP programme dedicated to the Awareness and Preparedness for Emergencies at the Local Level (APELL) has been instrumental in translating the broad need for warnings into a process for developing awareness of potential technological hazards and providing effective community collaboration for responding to industrial accidents. The involvement of industry and government officials in addressing warning and disaster preparedness interests of local communities has been influential in translating the awareness of a threat into practical, collaborative accomplishments. The Cameo hazardous materials directory promoted by APELL provides a useful example for local application of decision support systems technology.

83. The United Nations Economic Commission for Europe (ECE) has been instrumental in promoting early-warning capacities for industrial accidents through the Convention on the Transboundary Effects of Industrial Accidents. The 1992 Convention aims to strengthen national capacities and international cooperation in the prevention, preparedness and response to industrial accidents capable of causing transboundary effects through the promotion of mutual assistance, research and development, the exchange of information and the development of safety management technologies. An industrial accident notification system has been devised, including the designation of emergency notification contacts in the signatory countries. Two industrial accident coordinating centres have been established to enhance national capacity-building, with special emphasis on the needs and priorities of countries in transition.

84. A joint UNEP/Department of Humanitarian Affairs (United Nations) Environment Unit was established and located in the Department's Relief Coordination Branch in 1994 to enhance international capacities to respond to environmental aspects of disasters for countries whose ability to cope has been overwhelmed. The Unit provides international notification of specific emergencies, brokerage of required services between affected and donor countries, an information clearing-house, impact and response assessments, and facilitates the provision of emergency assistance.

85. The Environment Unit is developing interface procedures with relevant United Nations agencies and other organizations to strengthen regional and international procedures relating to notification and response to environmental emergencies. The joint involvement of UNEP and the Department of Humanitarian Affairs in this area was expanded in 1995 with the creation of an international Advisory Group on Environmental Emergencies, composed of experts and national focal points from around the world. The Group meets annually to review the work of the joint Unit and to act as a forum for sharing international experience relating to technological aspects of environmental emergencies.

E. Review of telecommunication activities

86. The International Telecommunication Union (ITU) is the world-wide organization through which Governments and the private commercial sector coordinate the establishment and operations of telecommunications networks and services. It is responsible for the regulation, standardization, coordination and development of international telecommunications and works for the harmonization of national policies. As the custodian of the international radio frequency spectrum, ITU has a critical role in fostering collaboration and operational standards among all bodies involved in early-warning systems.

87. The opportunities for improved early warnings provided by traditional telecommunications services and emerging modern technologies are considerable. The increasing flexibility demonstrated by systems in both private and public domains provide various types of interface with early-warning requirements at the international, country or local level.

88. ITU has been instrumental, working together with the Department of Humanitarian Affairs and specialized agencies of the United Nations engaged in emergency operations to obtain an international convention on disaster communications. While most of these efforts have concentrated on facilitating the use of telecommunications resources for disaster response activities in acute emergencies, ITU has also noted the important role of telecommunications in disaster mitigation. Resolution No. 7 of the ITU First World Telecommunication Development Conference in 1994 extended that awareness specifically to include early warnings.

F. Review of supporting activities and capacity-building

89. Virtually all of the early-warning systems described and the related activities of United Nations organizations contribute to the capacity-building of national or sectoral technical abilities. Early-warning practices can only exist to the extent that they are based on the developed skills and abilities of people related through structured organizational relationships. The programmes described and the respective United Nations agencies associated with them have each contributed training, the transfer of technology, research abilities or technical expertise to national counterpart and technical organizations. In addition, there are other organizations or individual programme activities in the United Nations system which play additional supporting roles for the early warning of natural and similar disasters.

90. WHO has a long-established commitment to preventive strategies based on the early detection of potential hazards and community awareness, incorporated in the ongoing public-health programmes of member countries. The organization has initiated an Epidemiological Information System that regularly issues bulletins and alerts relating to significant epidemiological problems. WHO's International Programme on Chemical Safety is conducted in close association with UNEP's APELL programme to provide technical advice to affected communities and also maintains comprehensive toxicological information and databases essential for early warning through a global network of collaborating centres.

91. The translation of early-warning information on slowly evolving disasters such as drought into effective response depends on the accurate assessment of the relative and changing vulnerability of the population within the affected area. For this purpose, computer programmes and equipment are becoming more accessible to quantify and map this vulnerability. WFP has taken advantage of advances in geo-referenced database management and in 1994 established a Vulnerability and Mapping Unit within its overall organizational Disaster Mitigation Strategy. WFP's disaster-mitigation activities are carried out in close collaboration with programmes of other cooperating partners, non-governmental organizations (NGOs) and Governments. In this respect, WFP's activities have placed a special emphasis on building sustainable vulnerability-mapping systems which encourage full government ownership. This has resulted in the development by several African countries of national vulnerability assessment and mapping committees or similar analysis systems integrated into national planning and development efforts.

92. UNEP's Global Resources Information Database (UNEP/GRID), located within UNEP's Environment Assessment Division, provides geo-referenced data to support environmental assessment within UNEP, among other United Nations agencies, and for national partners and clients. UNEP/GRID's Global Information System on Natural Hazards is a specific activity being implemented in conjunction with the Department of Humanitarian Affairs and the secretariat of the International Decade for Natural Disaster Reduction. This interpretive and display technology based on global data sets and GIS technology provides reference documentation to specialists and decision makers involved in hazard and risk assessment.

93. Other programmes within the United Nations system contribute, either directly or indirectly, to early warning capacity development. These activities include, by way of example, GIS training and networking conducted by the United Nations Institute for Training and Research (UNITAR) in the drought-prone areas of Africa. Similarly, the United Nations Programme on Space Applications is active in promoting an increased understanding and use of space technology for the improvement of early warning for natural disasters, particularly in developing countries.

94. Under its mandate to coordinate international humanitarian assistance, the Department of Humanitarian Affairs of the United Nations Secretariat is an important user and disseminator of information regarding the early identification and warning of possible disasters for the international response community. The Relief Coordination Branch maintains an Operations Centre which screens incoming information from technical institutions and national services for the early indication of potential emergencies. The branch reports and

facilitates the exchange of information for international response, including the implementation of standby arrangements for immediate technical or material assistance. Similarly, the Department's Complex Emergencies Division has the mandated responsibility of facilitating the exchange of information and coordinating the international response pertaining to drought conditions.

95. The development of the ReliefWeb global information system under the Department's auspices is a major initiative to identify and then provide access to consolidated information pertinent to early warning. HazardNet, the Emergency Preparedness Information Exchange (EPIX) and similar electronic information networks under development represent future possibilities of specialized information to support coordinated access to background information.

96. The Disaster Mitigation Branch, working in association with the secretariat of the International Decade in the Disaster Reduction Division of the Department of Humanitarian Affairs, is particularly suited to facilitate the broader international collaboration and programme attention necessary to strengthen regional and national capacities related to early-warning effectiveness. The Disaster Management Training Programme, supported jointly by UNDP and the Department of Humanitarian Affairs, also has demonstrated a capacity to initiate official and institutional strategies designed to improve hazard awareness, preparedness and response capabilities in more than 50 countries.

V. THE BASIS FOR INTERNATIONAL COORDINATION IN EARLY WARNING

97. A review of early-warning programmes within the United Nations system shows that there are gaps and insufficiencies in covering the hazards that have been cited in the present report. Coordinated efforts are required to harmonize existing programmes at international and regional levels to support the development and strengthening of national capabilities. The challenge before the United Nations, and the present opportunity to be decisively exploited, is to provide the leadership and the commitment to proceed with measures which can create an agreed international basis for the coordination and collective benefit of improved, comprehensive early-warning systems.

A. Role of the United Nations

98. The General Assembly, in its resolution 46/182 of 19 December 1991, on strengthening of the coordination of humanitarian emergency assistance of the United Nations, provides an explicit basis for the Organization to intensify its efforts for the systematic pooling, analysis and dissemination of early-warning information on natural and technological hazards. The Assembly specifies that the capacity of disaster-prone countries to receive, use and disseminate early-warning information should be strengthened and urges the international community to assist those countries in the establishment or enhancement of national early-warning systems. To do this, the United Nations must draw upon the full range of its existing early-warning knowledge, organizational experience and resources in a methodical way.

99. Policies and procedures are needed to link these requirements with the abilities of Governments, specialized institutions, intergovernmental and non-governmental organizations through a collective approach to forge a coherent and global framework for early warning.

100. The aim is functional coherence among the different specialist abilities which contribute to early warning. Equally, there is a need for systematic procedures to be agreed for related communications at all levels. The experiences of both WMO and IAEA demonstrate that a sustained and broadly based effort, drawing on the distributed technical abilities of various institutions and national collaborators, is critical for the successful coordination of international warning systems.

101. To pursue this process there is, first of all, the need for a collective United Nations approach to define a doctrine which reflects the true cross-sectoral, multidisciplinary, and inter-agency nature of comprehensive global early-warning activities. The experience and requirements of countries affected by natural and similar hazards, and particularly those of developing countries, need to guide the development or integration of services provided by technical agencies and international organizations.

102. This process can be furthered by designating an authority or mechanism to provide comprehensive oversight to early warning for natural and similar disasters within the United Nations system. Above all, there is a need to encourage more interaction between headquarters for the agreement of common early-warning objectives and the consideration of synergies among their respective programmes. The same process needs to be encouraged between bilateral or multilateral aid organizations so that technical-assistance planning and implementation can contribute to collaboration between agencies and with national counterpart organizations.

103. Possible mechanisms are already in place. The International Decade for Natural Disaster Reduction provides the basis of an international framework for concerted collaboration, guided by an explicit strategy in the Yokohama Strategy and Plan of Action. The Department of Humanitarian Affairs is able to guide and relate national policy initiatives and to link warnings with coordinated response capacities. Scientific and technical specialists are accessible through UNESCO, the United Nations Children's Fund (UNICEF), FAO, WHO, WMO, UNEP, IAEA and ITU, among other organizations. Support for national developmental planning efforts, management capacity-building and operational abilities is available through UNDP, the Department of Humanitarian Affairs, UNITAR, the United Nations Department for Development Support and Management Services and others. Practical steps are needed to consolidate these capacities on the basis of common agreement to focus the resources of individual organizations for collective purposes, while retaining the benefit of specialist experience in the implementation of responsibilities.

104. At the country level, the resident coordinator system provides a coordinating mechanism to encourage a policy emphasis for early warning when this is in the national interest. In this respect, the Country Strategy Note (CSN) is a useful instrument for disaster-prone developing countries to identify early-warning requirements in a national disaster-reduction strategy.

Coordinated by UNDP, but representing the interests of government and specialized agencies alike, the CSN can serve as a frame of reference for the joint preparation and coordinated proposal of early-warning requirements that are fully integrated into a country's national development priorities.

105. The United Nations Disaster Management Team (UNDMT) concept is another instrument that can be utilized within countries to improve the coordination among the organizations of the United Nations system represented within a country, in association with key government counterpart departments. Motivated by the Disaster Management Training Programme, UNDMT provides a structure for the coordinated planning and local assignment of functional responsibilities related to preparedness measures and ongoing capacity-building. It is also a mechanism which could be used after a disaster to work with national authorities to focus on early-warning aspects to define lessons learned and to prepare corresponding technical assistance proposals.

106. UNDP has a major role to play at the country level through its multisectoral advisory and funding role for development activities. UNDP can provide a sustained development programme environment for early-warning policy motivation and can support capacity-building in areas such as improved information management, training activities and preparedness operations planning. The UNDP resident representative is normally the United Nations resident coordinator. As such, he/she leads the coordinated approach of the United Nations system at the field level in all aspects of disaster management, including early warning. These functions are executed through the Disaster Management Team (UNDMT), in close cooperation with the Department of Humanitarian Affairs, and under the guidance of the Emergency Relief Coordinator/Under-Secretary-General for Humanitarian Affairs.

B. International agents for development

107. International coordination in early warning can be initiated, facilitated and supported by the United Nations system, but it requires the active support and involvement of other elements of the international development community.

108. Additional opportunities need to be found to encourage the contributions of the scientific and technical community to the decision-making process of technical and development assistance. Technical institutions and other forms of professional interest groups have a valuable role to play, particularly at the regional level, in articulating commonly held concerns or requirements of countries that are exposed to similar types of hazards or share common geographical or cultural attributes.

109. Decisions taken by individual donors in support of specific preferred programme sectors or single-country emphasis can result in a fragmentation of early-warning interests and initiatives. Urgent bilateral actions related to developing emergencies or inspired by a recent singular event can introduce inappropriate or unsustainable technologies. These actions can also contribute to a misrepresentation of an agency's ability or role within a larger national context of responsibilities.

110. Countries which depend on the use of international or regional early warnings have an obligation themselves to contribute the benefit of their experiences candidly to the international community. Their ability to do so depends partially on the rigorous application of their own critical assessments and evaluations about their capabilities, as well as requirements for improvements. Ex post facto assessments of early warning should be conducted following any emergency event and the observations used to revise existing procedures or operational relationships. These assessments, when made jointly with the participation of technical agencies, international organizations or donor representatives, should contribute to a collective process of evaluation leading to improvements in early warning.

111. The cumulative value of these efforts for improving international coordination of early warning can be realized through concerted efforts to modify existing policy. Member countries articulating common concerns in governing councils of United Nations agencies or regional economic and development associations can develop a consensus in guiding joint efforts for early-warning commitments.

112. Other forms of regional or political organization also provide opportunities to enhance coordination. One example is the Council of Europe's Open Partial Agreement on the Prevention of, Protection against and Organization of Relief in Major Natural and Technological Disasters. This Agreement, signed in 1987 and currently being updated, groups the interests of 20 States, 4 international organizations and 1 non-governmental organization in activities of common interest. These include compulsory contributions by member States for a European Warning System, composed of a network of 12 specialized European technical centres which implement training, information and research programmes that enhance early-warning capacities in the countries concerned.

113. Collaborative agreements, resolutions or other forms of joint acceptance of common interests, principles of operation, standards or shared resources are basic to encouraging a broader involvement of organizations in coordinating early-warning practices. The most effective early-warning systems pertaining to specific types of hazards are founded upon some type of basic agreement among participants.

VI. BUILDING CAPACITY FOR EARLY WARNING: ISSUES, GAPS, NEEDS

114. A review of early-warning activities of United Nations organizations reveals gaps and requirements for future improvements in effectiveness and coordination of early warning. Priority issues relate to improving the coordination of early warning within the United Nations system and supporting activities for national capacity-building in a larger developmental framework, as summarized below.

115. As both of the above subjects are crucial for the mobilization of concerted efforts within the International Framework of Action for the International Decade for Natural Disaster Reduction and the achievement of strategic Decade targets, a technical information paper has been prepared by the Decade secretariat to provide more elaboration. The paper provides direction for a

process in which coordinated early-warning activities during the next four years can contribute to the concluding event for the Decade. In this way, the process can contribute to the possibility of achieving an international consensus leading to established procedures for comprehensive and coordinated early warning as a basis for future disaster reduction in the twenty-first century.

A. Perceptions of early-warning problems

116. There is a lack of understanding about the social and organizational nature of early warnings. The process can be made more effective by the sustained application of tools and techniques appropriate for the required functions. The primary criterion for improvement has to be one of increased comprehension by the intended receivers of information. A critical priority for improved early warning relates to working relationships, leading to planned actions in an increasing number of local communities.

117. The access to and exchange of technical experience and abilities - commonly referred to as the transfer of technology - are important contributions to improving early-warning systems. Their usefulness is dependent upon the extent that the operators and users of the systems can sustain the technical abilities and costs of operation. It is necessary to scale technology to the specific levels of individual early-warning functions, recognizing the need to relate different technologies to each other, if their potential is to be fully achieved.

118. Warning systems need to be established and supported throughout normal times. Early warnings are associated with emergency conditions, but their usefulness is determined by the extent to which they are installed and active beforehand. Effective warning systems need to be involved with ongoing activities to maintain procedures and to develop a routine competence with effective inter-organizational relationships. They need continuous material and political support. Means are necessary to incorporate early-warning abilities into other activities which contribute to national development efforts.

119. Organizations associated with early warning need to encourage collaborators to focus on the fundamental objective of their efforts: to enable timely, coherent and effective response by officials and the public to a warning. There is often the need for political will to respond to the evidence of early warning, especially the very early signs, when there may be more immediate priorities facing a Government. For this reason, early-warning functions need to be linked to risk assessment and preparedness programmes within a coherent disaster-management strategy. To further this relationship, there is a need for continued research and development of the technical aspects of early-warning systems for explicit user-determined needs and applications.

B. Translating hazard identification into effective response

120. Early-warning activities span a range of professional disciplines, and each of them can have a very different perception about early warning. The interdisciplinary and multisectoral implications of early warnings have been

thus far inadequately addressed. There is a critical need to develop a broader common understanding among all the people involved in the warning process. This includes bridging gaps between scientists, communication technicians, media professionals, political decision makers, and other departmental or community officials responsible for implementing disaster-management functions.

121. There is an essential need to translate technical matters into a common understanding for the public. There is equally the need to improve the channels by which technical and scientific knowledge about disaster reduction can influence the political decision-making process. Whether the critical information conveyed by a warning is technical or administrative in nature, there is a need for increased dialogue between the producers and intended users of the information, in a language understandable by all, if it is to have any impact.

122. Efforts made towards formulating warnings need to be distinguished from those made towards their utilization. The collection and monitoring of hazard data differs from its subsequent interpretation, forecasting and presentation. The former activities may be enhanced by sophisticated techniques. The other functions may benefit from a more simplified approach to implementation. The tools and technologies suited to each of the tasks must be scaled to meet the needs and the abilities of the people involved.

123. Technological innovations for early warning need to be assessed to ensure that they provide added value, rather than additional costs, to early warning. Advanced technologies can have significant recurrent costs attributable to maintenance and their rapid evolution. There is a need for continuous training, and there are costs associated with ensuring the continued engagement of experienced technical staff. Both requirements are critical for the sustainability of a warning system.

C. International abilities and national experience

124. Effective warning systems require freely available data and reliable access for all collaborators. Exemplary warning systems encourage data exchange and seek to facilitate its utility by establishing commonly accepted standards, procedures, assessment criteria, etc. International agreement on operational standards and nomenclature for early warning can contribute to improved understanding and common benefit at all levels of activity.

125. There is a need to draw more attention to the differing international and national perspectives regarding what warning systems can do, technically, and what they need to do, practically. The better understanding of purpose, and a clear determination of users and their needs, can contribute to the design of more effective and sustainable warning systems. Advanced technology can create the opportunity for countries to identify and tailor systems to their own requirements or to devise related low-cost applications which can provide added value.

126. Export of these modified technologies can similarly benefit other developing countries. Through increased opportunities for multidisciplinary

dialogue among national partners and technical agencies, there is additional scope for international best practices to address countries' primary needs. There is an equal opportunity for individual countries to contribute their experience to the body of international understanding for improved early-warning capacities.

127. Early-warning systems require continuous human resources development and the documentation of experience. In addition to technical education, systems management training is essential for the improved effectiveness and better coordination of early-warning processes. Education is also needed to develop a broader understanding of the relationship between early warning and other aspects of disaster management. Efforts must be made to encourage the sharing of knowledge among developing countries and to document the experience of disaster-affected countries. More applied research regarding the effectiveness of early-warning measures needs to be conducted in primary disaster-affected developing countries by nationals of the country concerned.

D. Disseminating the message; communicating early warnings

128. International communication standards, best practices and coordinated efforts can contribute significant uniformity for common benefits to early warning. As in the case of communications related to emergency response, those used in the context of early warning can benefit from prior international agreement on privileged access, revised tariffs, designated responsibilities and coordinated functions.

129. The important function of communicating at the different levels of early-warning activity needs to be scaled appropriately to address the resources and skills available, and the requirements to be met. Both the needs and the limitations of users have to be translated into the application of the most suitable combination of traditional communications systems and modern technologies.

130. The different user tariffs applicable to various communications systems and the attributes of official, publicly owned and operated, as well as private commercial systems need to be evaluated more thoroughly in response to the particular needs of specific warning systems. The economics and feasibility of technical sustainability in the rapidly developing sector of communications needs to be matched against practical requirements evident in the different functions of information exchange in early-warning programmes.

131. There is a need to evaluate the opportunities provided by upgrading or including existing forms of familiar means of communication in the warning process as an extension of preparedness measures associated with early warning. Media relations, public radio and television broadcasting, telephone systems, amateur radio operators, which are often identified primarily with emergency response activities, can be effective in expanding the coverage of early warning.

E. Coordination of international and national capabilities

132. Improved global early-warning coordination is dependent on two strategies. Early-warning practices and systems need to become more effectively linked to the organizations and activities responsible for responding to the warning at the national and local levels. Improved early-warning coordination will be determined by a sustained commitment to capacity-building and the explicit involvement of the subject in development endeavour. A short-term, primarily relief-based perception of early warning could lead to fragmented efforts and emphasis on one sector or aspect at the expense of another.

133. The United Nations system offers the institutional base for guiding international efforts to formulate an early-warning doctrine. Such a frame of reference and body of thought, with clearly defined objectives, operating principles, and priority actions, is needed if the development of common practices, standards and collective efforts of parties involved is to be encouraged.

134. Equally, an operational agreement would be required among Governments, agencies, programme sectors and the development assistance community for such a commitment to be sustained. The process of building improved coordination needs to be based firmly on a systematic basis of ex post facto assessments of early-warning effectiveness of all future disasters, grounded in affected countries' experiences and based on lessons which have been learned by them.

135. Successful mobilization of resources at the international level and the resulting funding opportunities for programme activities relating to early warning would also create an incentive for better early-warning coordination. Commitments need to be sustained and consolidated to advance the development of capacities over time. Greater efficiency can be achieved by an understanding of the purpose of early warning, its mutually supporting functions and the resources required for its accomplishment.

VII. CONCLUDING OBSERVATIONS

136. The following conclusions and proposals are submitted for consideration with respect to the improvement of early-warning capabilities, better international coordination in their use and more effective and beneficial exchange of knowledge and technology:

(a) Within the existing International Framework of Action for the International Decade for Natural Disaster Reduction, there is a need for an informal mechanism to develop international doctrine and operational standards for improved and better coordinated global early-warning analysis, forecasting and dissemination. Such a mechanism should comprise representation from Governments, United Nations agencies and organizations, scientific and technical communities and other professional disciplines engaged in the early-warning process. The mechanism, an open-ended interdisciplinary and inter-agency working process, would provide a collective operating framework to direct a credible and effective application of early warning within disaster management

at all levels, in particular in support of local communities at risk from natural and similar disasters;

(b) National Governments of all countries are encouraged to undertake a systematic assessment of the extent to which current international, regional and national warning systems adequately address their own requirements to provide ready access to warnings for all citizens, and particularly those living in local communities most exposed to hazards. The assessment should be conducted with the full support of the organizations of the United Nations system, technical institutions and the international development community. The results of these assessments should contribute field-based experience to the international working group on early warning;

(c) Countries are encouraged to designate a national body or responsible agency as the focus for the coordination of early warnings based on an all-hazards approach. An acknowledged national authority can contribute to ensuring linkages with international efforts to streamline and coordinate priority activities and capacity-building. There is a need to strengthen links between local communities and centralized systems at national, regional and international levels to capitalize better on local variables and perceptions. At the same time a coherent national approach to disaster awareness, preparedness, management, response and reduction can be advanced;

(d) It is proposed that the mechanism referred to in subparagraph (a) above submit its recommendations to the General Assembly at its fifty-second session, outlining a comprehensive and streamlined operational framework for improved and better coordinated early-warning capacities world wide as well as propose international principles and operational modalities for United Nations organizations, national Governments, technical institutions and all professional interests concerned with early warning;

(e) The implementation of these proposals for the improvement of the early-warning capacities of the United Nations system with regard to natural disasters and similar disasters with an adverse impact on the environment should be duly considered in the preparatory process of the closing event for the International Decade for Natural Disaster Reduction foreseen for 1999. This will provide an opportunity to take stock of concerted international efforts to improve early warning and to ensure their full integration in the strategy for natural disaster reduction beyond the year 2000.

Notes

1/ Tampere Declaration, adopted by the Tampere Conference on Disaster Communications, Tampere, Finland, May 1991, paras. 13-14.

2/ See the report of the World Conference on Natural Disaster Reduction (Yokohama, 23-27 May 1994) (A/CONF.172/9), chap. V.

3/ Ibid., chap. I, resolution 1, annex I.

4/ Ibid., annex II.

5/ Ibid., chaps. IV and V.

6/ Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992 (A/CONF.151/26/Rev.1 (Vol. I and Vol. I/Corr.1, Vol. II, Vol. III and Vol. III/Corr.1)) (United Nations publication, Sales No. E.93.I.8 and corrigenda), vol. I: Resolutions Adopted by the Conference, resolution 1, annex II.

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SECURITY COUNCIL
Fiftieth year

Letter dated 9 October 1995 from the Permanent Representative of Lebanon to the United Nations addressed to the Secretary-General

On instructions from my Government and further to our earlier letters concerning Israeli practices and repeated Israeli attacks in Southern Lebanon and the western Bekaa, I have the honour to inform you of a series of Israeli attacks that occurred during the second half of September 1995:

19 September 1995

Israeli forces shelled areas outside Chaqra, Braachit, Majdel Silm, Touline, Qabrikha, Froun, Ghandouriyé and Tibnine.

20 September 1995

Israeli forces shelled the outskirts of Nabatiyé el-Faouqa.

Israeli military aircraft overflew the Nabatiyé area.

21 September 1995

Israeli forces shelled the hills of Machghara, Ain at-Tiné, Mlita and Jabal Safi, killing a Lebanese national.

Israeli military aircraft overflew and attacked Machghara and the course of the Nabaa al-Tasa.

Israeli military vessels opened fire on the coastline of Tyre.

22 September 1995

Israeli military aircraft overflew the Iqlim at-Touffah area.

24 September 1995

Israeli forces attacked the home of a Lebanese national in Rihane, Jezzine district, with a view to fortifying their positions.

25 September 1995

Israeli forces shelled areas outside Kafra, Yatar, Haddatha, Haris, Jbal al-Botm, Zibqine and Siddiqine in association with Israeli military aircraft flying overhead, as a result of which a boy from Haddatha was wounded.

26 September 1995

Israeli forces shelled areas outside Jarjoua, Ain Bousoir, Mlita, Jabal Safi, Qabrikha, Touline, Majdel Silm and Souané.

27 September 1995

Israeli forces shelled areas outside Ain Bousoir, Jarjoua, Arabsalim, Machghara and the course of the Litani River in Iqlim at-Touffah.

Israeli military aircraft overflew the Chtaura area.

28 September 1995

Israeli forces shelled areas outside Aita al-Jabal, Haddatha, Haris, Kafra and Yatar.

29 September 1995

Israeli forces shelled the Nabatiyé al-Faouqa area and the areas outside Kfar Man and Kafrtibnit.

30 September 1995

Israeli forces shelled areas outside Chaqra, Majdel Silm, Qabrikha, Touline and Tibnine.

The Lebanese Government strongly condemns the repeated Israeli attacks, which have brought enormous damage to property. It further condemns in the strongest terms the arbitrary practices against civilians that have prevented them from cultivating their fields, pursuing their occupations and earning their livelihoods.

Like previous attacks, this new series constitutes flagrant aggression against the sovereignty and independence of Lebanon and represents another flagrant violation of international law and fundamental human rights.

The continued violence is ultimately due to Israel's maintenance of its occupation and its refusal to comply with Security Council resolution 425 (1978), which calls for Israel's withdrawal to the internationally recognized boundaries and for the Lebanese Government to be allowed to extend its authority over all its territory by means of its legally constitut forces.

I should be grateful if you would have this letter circulated as a document of the General Assembly, under agenda item 44, and of the Security Council.

(Signed) Samir MOUBARAK
Ambassador
Permanent Representative

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General Assembly

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A/50/528
9 October 1995

ORIGINAL: ENGLISH

Fiftieth session
Agenda item 163

STRENGTHENING OF THE UNITED NATIONS SYSTEM

Letter dated 5 October 1995 from the Permanent Representative of Slovenia to the United Nations addressed to the Secretary-General

I have the honour to transmit, attached hereto, the letter by H.E. Mr. Zoran Thaler, Minister for Foreign Affairs of the Republic of Slovenia.

I should be grateful if you would have the present and the aforementioned letter circulated as an official document of the General Assembly under agenda item 163.

(Signed) Dr. Danilo TÜRK
Ambassador

95-30357 (E) 131095 171095

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ANNEX

Letter dated 30 August 1995 from the Minister for Foreign Affairs of the Republic of Slovenia addressed to the Secretary-General

I wish to share with you some thoughts on several issues concerning the ongoing debate on the reform of the United nations.

The intensity and scope of this debate have become very impressive. Several working groups of the General Assembly are discussing various aspects of the necessary reforms and a large number of research teams, university-based groups and non-governmental organizations are submitting proposals for reforms. Ideas proliferate. There is no disagreement about the need for the reform.

I agree with your view, expressed at the commemoration of the fiftieth anniversary of the signing of the Charter of the United Nations in San Francisco, to the effect that the main task now is to establish a broad-based and forward-oriented set of ideas and to formulate specific proposals for reform. The purpose should be to develop the United Nations into an adequate instrument to help in global management of the issues mankind is facing today.

Slovenia is intensely interested in the success of these endeavours. Our representatives are participating actively in the working groups of the General Assembly and in various informal settings. I offer some of our views on the issues of the reform o the United Nations with the hope that they will prove to be useful.

After very careful reflection on issues of the reform of the United Nations we came to the conclusion that most of the necessary reforms can take place without a major revision of the Charter. However, it is necessary that the notion of the "living Charter" be given a meaning which will correspond to the needs of our time and, consequently, provide for adequate implementation of the purposes and principles of the Charter in future.

Our proposals could be summarized in the following three commitments:

(a) Commitment to ensure adequate financing of the activities of the United Nations and to further reform the Secretariat;

(b) Commitment to bring up to date the United Nations mechanisms in the field of economic and social development so that the programmes of the recent United Nations summits and conferences can be effectively implemented;

(c) Commitment to reform the Security Council.

I believe that it is important to pursue the goals summarized in the preceding three points with determination and with a sense of urgency. Hence their formulation as commitments.

These three commitments are fundamental and ought to be pursued in parallel. The practical priority might be given to tasks which ought to be less difficult to implement - as implied in the suggested order of commitments.

Let me now indicate some specific tasks for the implementation of the three basic commitments.

1. Commitment to ensure adequate financing of the activities of the United Nations and to further reform the Secretariat.

This commitment consists of two major tasks which are connected reciprocally. Slovenia, as one of the States Members of the United Nations that pays its contributions in full and on time, wishes, first of all, to emphasize the need to ensure the general compliance of the United Nations membership with their duties concerning the payment of their assessed contributions. No financial arrangment can replace this basic duty.

Furthermore, a review of the scale of assessments is overdue. Current proposals which take into account the present levels of GDP of the States Members of the United Nations and other relevant criteria represent an adequate basis for the finalization of a new scale. Acceleration of work towards adoption of the new scale of assessment is another priority in the context of this task.

On the other hand, it is necessary to reorganize and slim down the Secretariat so that its size and composition would correspond to the changing priorities of the Organization. In the same spirit it would be necessary to review the peace-keeping operations with the aim of formulating ways and means to lower and keep their costs within manageable limits. A revised and equitable scale of assessments for the peace-keeping operations would be helpful in this context.

2. Commitment to adjust the United Nations mechanisms in the field of economic and social development so that the programmes of the recent United Nations summits and conferences can be effectively implemented.

The present world situation is characterized by the changed economic environment, by an ever-growing importance of market forces, private initiative, entrepreneurship and free trade, as well as by the new international economic institutions such as the World Trade Organization. In general the role of the State in the economy is being diminished, the command economy in all its facets is slowly weakening and the role of the free market is being enhanced. This fact is to be taken into account by the United Nations. The changed reality has been expressed in a variety of ways at the recent United Nations summits and conferences relating to social, environmental and human rights issues.

The United Nations should in all its activities relating to the economic and social field proceed from a clear understanding of the new circumstances. In these circumstances it should not be expected from the United Nations to create unnecessary supra-State structures, i.e. an "economic security council". The United Nations can be useful by doing more to facilitate high-level policy

dialogue and coordination and carefully targeted operational cooperation for development.

One of the needs in this domain relates to the necessary strengthening of the functional commissions of the Economic and Social Council. The Commission on Sustainable Development, the Commission for Social Development and the Commission on Population and Development have to become places where decision makers meet and devise specific guidelines. It would be very important to ensure the participation of high government officials and ministers, including the trade and finance ministers, at those meetings of the mentioned commissions which require direct communication and decisions at the ministerial level. Furthermore, creative efforts are needed to enhance the role of the Commission on Human Rights and the Commission on the Status of Women, and to develop them into effective instruments of practical action in their domains.

Finally, there is a need to update and refocus the mandates and programmes of such organizations as the United Nations Conference on Trade and Development and the United Nations Industrial Development Organization, with a view to making them more effective in the changed economic and institutional environment of the world today which tends to be very different from the one in which they were created.

3. Commitment to reform the Security Council.

The discussions on the reform of the Security Council have intensified in the past two years. Furthermore, they have coincided with growing scepticism regarding the actual effects of the activities of the present Security Council. Its recent activities in several situations have been characterized, inter alia, by a rapidly growing number of unimplemented resolutions and statements - an important indication of the deficient effectiveness of the Council.

The role of the Council ought to be enhanced and, with this ambition in mind, reasonably and gradually enlarged. The number of its permanent and non-permanent members should be increased. An enlarged Security Council will be in a better position to realistically assess the diverse security issues and diverse responses which might be required.

Slovenia is participating actively in the work of the General Assembly working group on the reform of the Security Council and will continue to make, together with other like-minded States, specific proposals concerning the composition, the working methods and other aspects of the necessary reforms of the Security Council.

There is, however, one specific question which I would like to suggest for your reflection. It relates to the need to develop further the necessary cooperation between the Security Council and the States Members of the United Nations.

The idea of organizing orientation debates open to all Member States whenever the Council feels the need to start considering a new situation or to take a major decision relating to a situation under consideration seems particularly promising. I believe that the Secretary-General should consider

initiating such orientation debates in accordance with his powers under the Charter.

These are, your Excellency, some of my thoughts that I wish to share with you at this stage. I hope that the future months will provide us with an opportunity to meet and discuss these and other ideas and that the work of the United Nations bodies dealing with various aspects of the necessary reform of the United Nations will yield practical results. Let me, in conclusion, reiterate the determination of Slovenia to contirbute its share in this effort.

(Signed) Z. THALER
Minister for Foreign Affairs
Republic of Slovenia

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GENERAL ASSEMBLY
Fiftieth session
Agenda item 55
QUESTION OF CYPRUS

SECURITY COUNCIL
Fiftieth year

Letter dated 6 October 1995 from the Permanent Representative of Turkey to the United Nations addressed to the Secretary-General

I have the honour to transmit herewith a letter dated 5 October 1995, addressed to you by His Excellency Mr. Osman Ertuğ, Representative of the Turkish Republic of Northern Cyprus.

I should be grateful if the text of the present letter, and its annex, could be circulated as a document of the fiftieth session of the General Assembly, under agenda item 55, and of the Security Council.

(Signed) Hüseyin E. ÇELEM
Ambassador
Permanent Representative

95-30259 (E) 091095 101095

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Annex

Letter dated 5 October 1995 from Mr. Osman Ertuğ addressed to the Secretary-General

Upon instructions from my Government, I have the honour to refer to the letter dated 25 September 1995 addressed to you by Mr. Nicos Agathocleous, the Greek Cypriot Representative at the United Nations, which contains allegations regarding "violations of the airspace of the Republic" (A/50/477-S/1995/822).

I would like to recall that previous similar allegations were rejected in toto in my communication addressed to you on 11 September 1995 (A/49/964-S/1995/788), and to stress that the present ones are no more credible or valid than those previously made. In putting out such allegations, the Greek Cypriot administration knows only too well that the areas referred to as the northern coast of the island and the "northern and north-western flight information region (FIR) of Nicosia" are in fact areas which are under the sovereignty and jurisdiction of the Turkish Republic of Northern Cyprus. Once again, without going into the details of the Greek Cypriot charges, which do not merit a detailed reply, I wish to reiterate that the flights within the airspace of Northern Cyprus are with the full knowledge and consent of the appropriate authorities of the Turkish Republic of Northern Cyprus, over which the Greek Cypriot administration has no right of say whatsoever.

The reason behind the Greek Cypriot side's persistent barrage of allegations regarding this or similar other subjects is clearly to cover up its intensive militarization campaign in the South, as part of the so-called "joint defence doctrine" with Greece. It is noteworthy that, in the context of the said scheme, the Greek Cypriot administration and Greece have recently carried out joint military exercises in Southern Cyprus code-named "Nikiforos 95", in which the Greek air force and navy also took part. During these exercises, a barrage of slogans reflecting the Greek-Greek Cypriot intentions to "attack and capture" Northern Cyprus also poured out from the South, leadership and public alike. As is known, bolstered by its newly purchased offensive weapons and the military support of Greece, the Greek Cypriot leadership has now gone so far as declaring that war is an option for the Greek Cypriot side in Cyprus.

Furthermore, through such allegations, the Greek Cypriot side is aiming to create a smokescreen for its evasion of the negotiating table. The Greek Cypriot side continues to reject the implementation of the confidence-building measures and the Greek Cypriot leader, Mr. Clerides, stubbornly rejects President Denktaş's repeated calls for a face-to-face dialogue. Rather than being supportive of your mission of good offices, the Greek Cypriot administration is increasingly distancing itself from the negotiating process by shifting the focus to European Union membership, which it has made a precondition for the talks, with a view to altering the established parameters of an overall settlement.

I am confident that the international community will not fail to notice the new efforts of the Greek Cypriot side aimed at escalating the conflict and its policy of rejecting direct talks, and will do what it can to persuade the other side to abandon this counterproductive approach.

I should be grateful if this letter could be circulated as a document of the fiftieth session of the General Assembly, under agenda item 55, and of the Security Council.

(Signed) Osman ERTUĞ
Representative
Turkish Republic of Northern Cyprus